Dynamics and predicted distribution of an irrupting 'sleeper' population: fallow deer in Tasmania

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Abstract

Sleeper populations of non-native species can remain at low abundance for decades before irrupting. For over a century, fallow deer (*Dama dama*) in the island state of Tasmania, Australia, remained at low abundance and close to the region in which they were released. Recently, there are indications the population has increased in abundance and distribution. Here, we spatially quantify the population change using a time series of annual spotlight counts from 1985 to 2019 (total of 5,761 counts). Next, we predict the potential for further range expansion, using global occurrences to characterise the species' climatic niche, and remote-camera surveys (n = 3,225) to model fine-grained habitat suitability. Spotlight counts of fallow deer increased by 11.5% annually, resulting in a 40-fold increase from 1985 to 2019. The core distribution increased 2.9-fold during this 35-year period, and now spans c. 27% of Tasmania's land area. Satellite populations have established in locations where farmed deer have escaped or been released, suggesting that humans have facilitated some of the range expansion via new introduction events. Based on climate and habitat suitability, our models predict that 56% of Tasmania is suitable under the current climate. This suggests range expansion is likely to continue unless the population is actively managed, which could include the eradication of satellite populations and containment of core populations. This case study cautions that despite over a century of slow population growth, sleeper populations of non-native species can abruptly increase.

Full Text

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